

POLYCRYSTALLINE CONDUCTING POLYMERS AND PRECURSORS
THEREOF HAVING ADJUSTABLE MORPHOLOGY AND PHYSICAL
PROPERTIES

ABSTRACT OF THE DISCLOSURE

Polycrystalline materials containing crystallites of precursors to electrically conductive polymers and electrically conductive polymers are described which have an adjustable high degree of crystallinity. The interstitial regions between the crystallites contain amorphous material containing precursors to electrically conductive polymers and/or electrically conductive polymers. The degree of crystallinity is achieved by preparing the materials under conditions which provide a high degree of mobility to the polymer molecules permitting them to associate with one another to form a crystalline state. This is preferably achieved by including additives, such as plasticizers and diluents, to the solution from which the polycrystalline material is formed. The morphology of the polycrystalline material is adjustable to modify the properties of the material such as the degree of crystallinity, crystal grain size, glass transition temperature, thermal coefficient of expansion and degree of electrical conductivity. High levels of electrical conductivity are achieved in the electrically conductive polycrystalline materials without stretch orienting the material. The enhanced electrical conductivity is isotropic as compared to a stretch oriented film which has anisotropic electrical conductivity.